

Behavior and Lifestyle Factors Related to Quality of Life in Junior High School Students

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Abstract

Objectives: To analyze actual conditions of the quality of life (QOL) in junior high school students, we developed a questionnaire based on the PRECEDE-PROCEED model, and we conducted a survey by using this questionnaire.

Methods: We conducted a workshop organized with 29 specialists on school health and community health to develop the questionnaire. The QOL outcome was assessed by the QOL Profile-Adolescent Version (QOLPAV). The subjects of the questionnaire surveys were 1600 general students in four junior high schools. To investigate a correlation between QOLPAV, behaviors and three enhancing factors, two different multiple regression models were constructed.

Results: The question battery for QOLPAV was found to be a high value of Chronbach's α . Among present subjects, 16.5% were categorized as "problematic" or "very problematic" classified by QOLPAV scores. In the first multiple regression model, significantly high odds ratios were obtained between the QOLPAV and 4 questions for behaviors, such as "studying with high motivation" (OR 1.64), "getting along well with my friends" (2.72), "having things I am interested in" (1.70), and "making my own decisions" (1.80). In the second model, significantly high odds ratios were obtained commonly between the above 4 questions about behaviors and 2 questions on enabling factors, such as "easy to understand lessons" (1.32–1.71) and "speaking to friends easily" (1.30–3.22).

Conclusions: 1) We developed a questionnaire to analyze the actual condition of QOL in junior high school students with sufficient validity and availability. 2) Among the present subjects, 16.5% were found to be problematic QOLPAV. 3) Among the factors of behaviors, those representing positive willing and high coping ability with the elements of each school life contributed significantly to the QOLPAV. And among enhancing factors, "enabling factors" and "reinforcing factors" were stronger contributors to the behaviors strongly related to the QOLPAV than that of "predisposing factors".

Key words: junior high school, behavior and lifestyle, the PRECEDE-PROCEED model, quality of life, quality of Life Profile-Adolescent Version

Introduction

According to a questionnaire-based survey conducted by school nurses, the number of students with mental health prob-

lems in junior and senior high schools in Japan is increasing (1). School attendants, defined as school children that attend school during the daytime, complained of depression because of tension produced by the gap between life in school and life after school (2). A recent report has also pointed out three important changes in children's lifestyles that may significantly influence school children's tension, such as changes in time-related patterns (inversion of day and night), decreases in the amount and duration of exercise and changes in eating habits (e.g., increased consumption of fast food) (3). Moreover, children were found to be committing crimes at a younger age than in

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the past (4). The importance of developing ways to deal with mental health problems among adolescents has been emphasized (5) and the need to investigate student's "behavior and lifestyle" (behaviors) has also been noted (6). Practical health education about behaviors in Japan has been conducted by school nurses (7). In 2000, as part of a National Health Promotion Campaign, "the Sukoyaka Family 21 project" (8) was initiated by the Ministry of Health, Labour and Welfare. This project emphasizes the importance of nationwide health promotion and aims to help people achieve a higher quality of life (QOL) by empowering them to manage their own health.

Raphael (9) mentioned that QOL seems implicated in a wide range of adolescent health outcomes and health-related behaviors. Lately, researches on the development of a QOL assessment scale have been conducted in Japan (10–12). Ueda pointed out that it was important for junior high school students to change behaviors and to improve QOL by themselves in order to solve psychological problems (13).

With regard to health screening the physical health of all of the students in Japan has been examined in mandatory annual school health examinations since the School Health Law took effect in 1973 (14). These examinations do not include the assessment of QOL or behavior assessments in junior high schools or in elementary schools. As mentioned above (3), the change of lifestyle significantly influences mental situation and, in general, coping with that situation cannot be achieved only by physical treatment. Thus, it is necessary to assess QOL and behaviors of students by some other strategy in addition to physical assessments.

From this viewpoint, we organized a working group consisting of specialists in Kumamoto prefecture having an interest in QOL and behaviors of children. To develop a questionnaire to clarify QOL in junior high school students, this working group conducted a workshop on strategies for developing intervention approaches for empowerment of school student's

self coping ability with various conditions in their school life, with a focus on their QOL, behaviors and enhancing factors. We adopted the PRECEDE-PROCEED model (15) as the best available model for studying these problems. In the National Health Promotion Campaign this model was introduced as an appropriate theoretical model for health promotion (8). The aim of this model is to promote modification of behaviors and enhance QOL by improving the individual's ability to cope with various factors encountered in daily life. This model was described by Green and Kreuter (15) as an integrated planning process for health promotion and has been used among adolescents as the basis for development of prevention models for alcohol use (16), smoking behavior (17) and violence (18). Regarding behaviors, Fujii (19) have used this model to study the effect of a collaborative system related to health promotion during adolescence. However, this study gathered information about student's behaviors from parents, not students, and it was concerned with physical illnesses, not mental health. There are presently no intervention approaches in place for evaluating an actual QOL in junior high school students using this model (based on the health promotion) like the present study. Finally, using the questionnaire we developed, we conducted a mass survey of junior high school students and clarified the actual QOL and behaviors in those students.

Materials and Methods

Subjects

To obtain the subjects representing general junior high school students for the present study the subjects were selected from areas in Kumamoto Pref., such as urban, suburban and rural areas. Before conducting the questionnaire survey we went to the five targeted schools to explain the purpose and procedure of the study and to obtain the consent of the school staffs. A total of 4 schools, such as A and B from the urban area,

Table 1 Characteristics of participating students^{a)}

School	Location	Gender	Grade and Numbers of students			
			Seventh (12~13 y)	Eighth (13~14 y)	Ninth (14~15 y)	Total (%)
School A	Urban	Male	95	131	126	352 (22.0)
		Female	112	109	99	320 (20.0)
		Total	207	240	225	672 (42.0)
School B	Urban	Male	78	73	73	224 (14.0)
		Female	74	77	75	226 (14.1)
		Total	152	150	148	450 (28.1)
School C	Suburban	Male	53	54	69	176 (11.0)
		Female	52	43	62	157 (9.8)
		Total	105	97	131	333 (20.8)
School D	Rural	Male	16	32	25	73 (4.6)
		Female	22	18	32	72 (4.5)
		Total	38	50	57	145 (9.1)
Total	Total	Male	242	290	293	825 (51.5)
		Female	260	247	268	775 (48.4)
		Total	502	537	561	1600 (100.0)

^{a)} The Kumamoto Board of Education categorized schools in the Prefecture into 3 types according to student population. The schools that participated in this study happened to represent all three types.

C from the suburban area and D from the rural area, agreed to undertake.

A total of 1808 questionnaires we developed were mailed to 4 schools in September 2002. The subjective students received the questionnaire in each classroom from their teacher and answered the questions during the homeroom period. We received 1742 (96.3%) responses. Among those, 1600 (88.4%) were eligible for the present analysis. As shown in Table 1, the number of responses from each school was as follows; 672 for school A, 450 for B, 333 for C and 145 for D. Sex distribution was 51.5% (825) for male and 48.4% (775) for female. Age distribution was 31.4% (502) for seventh grade, 33.6% (337) for eighth grade and 35.0% (561) for ninth grade. All participants in the study were school attendants, excluding school refusers.

Working group

The working group members who joined our workshop met the condition of living and working as personnel of school health and community health in the areas schools A, B, C and D were located in (20). Finally 29 personnel participated in the workshop; including 5 researchers in the field of preventive medicine, 2 researchers in the field of education, 2 pediatric neurologists, 1 clinical psychologist, 1 nutritional scientist, 10 public health nurses, 3 school nurses, 3 school teachers, 1 nurse and 1 nursery attendant. All of the members who participated in our workshop had received agreement to participate from the head of their organization or institute. Meetings were held once a month from 2001 to 2004 at the laboratory of our department.

Development of the questionnaire

To develop the questionnaire by the workshop we adopted the PRECEDE-PROCEED model created by Green et al. (15), which consists of the following areas for the PRECEDE process, such as “QOL”, “health”, “behaviors” and “environ-

ment”, and three types of enhancing factors, namely “predisposing”, “reinforcing” and “enabling factors” (21). The current study did not include questions related to health education and/or administration because the present investigation did not aim to establish policy and/or health education programs.

In the process of developing the questionnaire, 168 questions designated by the workshop group were mapped in each area of the PRECEDE-PROCEED model. Firstly we focused on 54 questions for the QOL Profile-Adolescent Version (QOLPAV) (22) according to the original Toronto study and discussed selecting appropriate items from those and modifying them for the Japanese junior high school students based on the workshop members’ experience and knowledge. Secondly we focused on 37 questions in the area of behaviors related to the items of QOLPAV set up by first discussion. In this discussion we created five indexes, such as “school”, “relationships”, “life habits”, “creation” and “self”. One or two questions for each index were selected based on the aspect of importance and practicality of application. Thirdly, we discussed residual items designated by the workshop on three enhancing factors related to behaviors by the second discussion. In this discussion 13 questions were set up for 3 enhancing factors.

After those discussions we made a tentative questionnaire form and, using this, performed a pilot study at the subjective schools. A focus group interview (23) was conducted with the subjective students in each school (6–10 students per each) on the day following the pilot survey. We asked students about their impressions of the questionnaire, whether there were any suggested modifications of supplementary questions and whether they considered any of the questions unnecessary.

After the workshop and the pilot study, we developed the present questionnaire as shown in Figure 1 and, using this, we conducted a mass survey to the subjective students as above mentioned. For the QOLPAV, 7 items were set up, such as “your appearance”, “knowing who I am”, “school life”, “home life”,

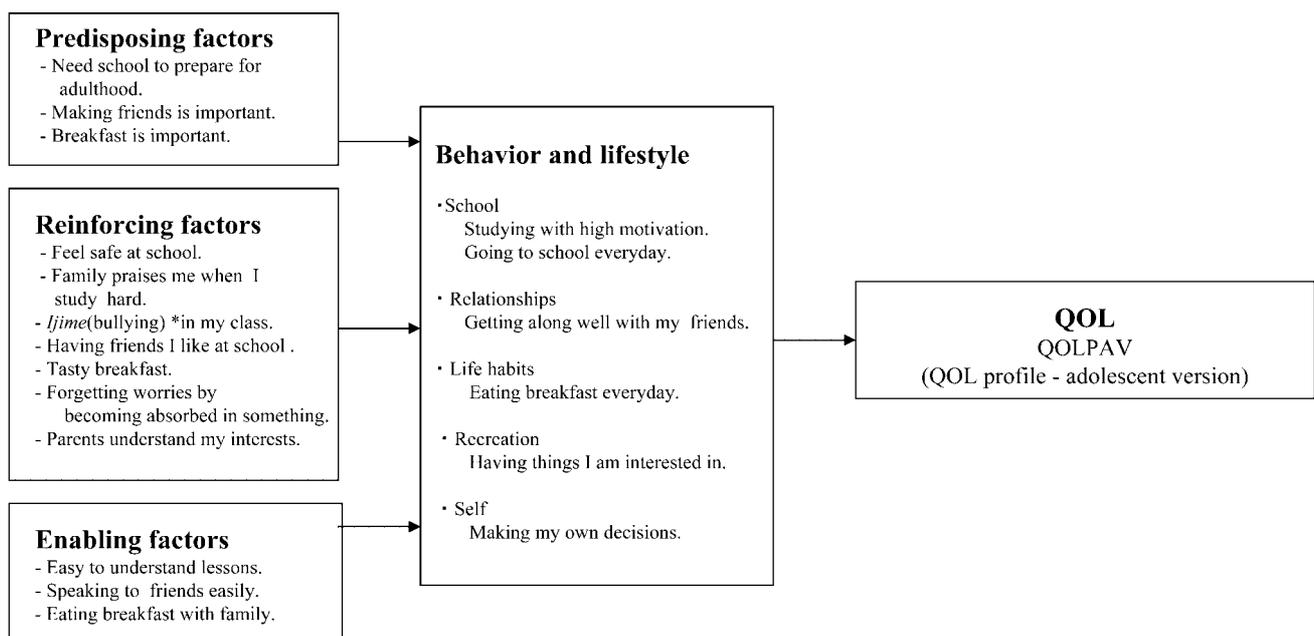


Fig. 1 Overall questionnaire framework. (* Ijime: teasing, bullying)

“learning about new things”, “having hope for the future” and “spending my life”. For the enhancing factors, 3 questions for “predisposing factors”, 7 questions for “reinforcing factors” and 3 questions for “enabling factors” were created. Additionally, for the area of “health” in the PRECEDE-PROCEED model, we set up a questionnaire battery of self-rating depression scale (SDS) (24) and a question on “sleeping”, both which were used in the previous investigation on the mental situation of junior high school student conducted by our colleagues (20).

To evaluate QOLPAV we adopted the method developed by the Toronto University Health Promotion Center (22, 25). For the overall scores for seven items, we set up a scale of 1–5 based on the two aspects of “importance” and “satisfaction”. Importance scores serve as a weight for converting satisfaction scores into QOLPAV scores [$QOL = (Importance\ Score \times 3) \times (Satisfaction\ Score - 3)$] (25). Results calculated scores for the questions in the original QOLPAV ranged from -3.33 to 3.33 (22, 25).

The scores were calculated by averaging the total points from the seven items and the results were categorized into five types (very good, acceptable, adequate, problematic, very problematic) according to cut off points determined by the Toronto University Health Promotion Center (22, 25). Scores less than -0.51 indicated problematic QOL, and scores over -0.50 were considered normal (22, 25).

Statistical analysis

In the present study, QOLPAV, behaviors and three types of enhancing factors were examined using a questionnaire based on our theoretical model (Fig. 1). The area of environment and health as factors of the PRECEDE-PROCEED model should also be looked into for the present analysis. However we exclude this area in this analysis because we focused on the present study to clarify actual QOL and correlation between QOL and related factors of QOL of junior high school students. We will present the results of the analysis of the health and environment area in the future.

After calculation of the numbers and percentage of answers for each multi-choice question, and classification of each QOLPAV, behaviors and three enhancing factors were analyzed using multiple regression analysis. In the first step we clarified the correlation between QOLPAV as a dependent variable and behaviors as explanatory variables. In the second step we clarified correlation between behaviors as dependent variables and the three enhancing factors as explanatory variables. School, grade and sex were adopted as confounding factors in both ways of analysis. Associations between adopted variables were expressed as odds ratios with 95% confidence intervals.

The calculation of numbers and percentage of answers to each multi-choice was used with Excel 2001 for Macintosh (26) and multiple regression analysis was performed with SPSS ver. 11.0 for Windows (27).

Results

The percentage of the subjects who answered “importance” to each of the 7 questions in the area of QOLPAV was

Table 2 Types indicated from an overall score on Quality of life profile for adolescents version (QOLPAV)

Types (score [†])	Number of answers (%)		
	Male	Female	Total
Very good (≥1.50)	136 (8.5)	73 (4.6)	209 (13.1)
Acceptable situation (0.51~1.50)	236 (14.8)	215 (13.4)	451 (28.2)
Adequate situation (-0.50~0.50)	340 (21.3)	335 (20.9)	675 (42.2)
Problematic (-0.51~-1.50)	104 (6.5)	143 (8.9)	247 (15.4)
Very problematic (≥-1.50)	9 (0.5)	9 (0.5)	18 (1.1)

[†] Score range was calculated from -3.33 to +3.33 under the present study.

from 83.2~96.2%. On the contrary, the subjects who answered “satisfaction” was to be 44.9~81.4%. The Chronbach’s α in the “importance” category, “satisfaction” category and both aspects of these for the QOLPAV were 0.72, 0.81 and 0.84, correspondingly. These data are not show in the Table. Based on their overall scores, 265 (16.5%) of the students were classified as problematic type (“problematic”, “very problematic”) in the QOLPAV, as shown in Table 2. The score range for the results of the QOLPAV was -2.57~+3.33. The mean score and standard deviation of the QOLPAV was 0.41±0.98 for the total subjects not shown in the Table.

Table 3 shows the results for the 6 questions on behaviors. The highest prevalence of negative responses (“rarely” or “not at all”) was 39.4% for the question “studying with high motivation” following “having things I am interested in” (18.0%) and “making my own decisions” (14.7%). Many students responded positively to the questions of “eating breakfast everyday” and “going to school everyday” (79.1% and 94.3%, respectively).

Table 4 shows the results for the predisposing, enabling, and reinforcing factors. For the question of “eating breakfast with my family”, 48.1% of the students answered “seldom/never”. There were high percentages of positive answers to questions pertaining to relationships with friends such as “making friends is important” (88.8%), “having many friends I like at school” (79.9%) and “often speaking to friends easily” (69.8%).

The results of logistic regression analyses of the effect of behaviors to QOLPAV identified four significant factors, namely “studying with high motivation” (OR 1.64), “getting along well with my friends” (2.72), “having things I am interested in” (1.70) and “making my own decisions” (1.80) (Table 5).

The results of multiple regression analysis of the three enhancing factors to 4 behaviors showed significant effect with QOLPAV in the first regression analysis (Table 6). The questions about “need school to prepare for adulthood” (1.36), “parents understand my interests” (1.21) and “easy to understand lesson” (1.71) showed significantly increased odds ratios to “studying with high motivation”. The questions of “feel safe at school” (2.29), “easy to understand lesson” (1.32) and “speaking to friends easily” (3.22) showed significantly increased odds ratios to “getting along with my friends”. The questions of “ijime (bullying) in my class” (1.25), “forgetting worries by becoming absorbed in something” (1.29), “easy to understand lessons” (1.58) and “speaking to friends easily” (1.35) showed significantly increased odds ratios with “having things I am interested in”. The questions of “forgetting worries

Table 3 Responses to questions about “Behavior and Lifestyle”

Indexes	Questions	Answers	Number of answers (%)		
			Male=825	Female=775	Total=1600
School	Studying with high motivation.	Always	63 (7.6)	49 (6.3)	112 (7.0)
		Sometimes	398 (48.2)	459 (59.2)	857 (53.6)
		<u>Rarely</u> †	239 (29.0)	203 (26.2)	442 (27.6)
		<u>Not at all</u>	125 (15.2)	64 (8.3)	189 (11.8)
School	Going to school every day.	Everyday	772 (93.6)	737 (95.1)	1509 (94.3)
		<u>Sometimes</u>	45 (5.5)	33 (4.3)	78 (4.9)
		<u>Rarely</u>	5 (0.6)	5 (0.6)	10 (0.6)
		<u>Not at all</u>	3 (0.4)	0 (0.0)	3 (0.2)
Relationships	Getting along with my friends.	Very well	343 (41.6)	271 (35.0)	614 (38.4)
		Sometimes	395 (47.9)	408 (52.6)	803 (50.2)
		<u>Rarely</u>	69 (8.4)	87 (11.2)	156 (9.8)
		<u>Not at all</u>	18 (2.2)	9 (1.2)	27 (1.7)
Life habits	Eating breakfast everyday.	Everyday	651 (78.9)	614 (79.2)	1265 (79.1)
		<u>Sometimes</u>	107 (13.0)	118 (15.2)	225 (14.1)
		<u>Rarely</u>	37 (4.5)	28 (3.6)	65 (4.1)
		<u>Never</u>	30 (3.6)	15 (1.9)	45 (2.8)
Recreation	Having things I am interested in.	Many	162 (19.6)	118 (15.2)	280 (17.5)
		Some	546 (66.2)	485 (62.6)	1031 (64.5)
		<u>Not many</u>	88 (10.7)	146 (18.8)	234 (14.6)
		<u>None</u>	29 (3.5)	26 (3.4)	55 (3.4)
Self	Making my own decisions.	Always	164 (19.9)	87 (11.2)	251 (15.7)
		Often	555 (67.3)	559 (72.1)	1114 (69.6)
		<u>Sometimes</u>	95 (11.5)	117 (15.1)	212 (13.3)
		<u>Never</u>	11 (1.3)	12 (1.5)	23 (1.4)

† Underline indicates negative answers.

Table 4 Responses to questions about predisposing, reinforcing and enabling factors

Areas	Questions	Number of answers (%)			
Predisposing factors	Need school to prepare for adulthood.	Need	Some need	<u>Little need</u> †	<u>Don't need</u>
		751 (46.9)	648 (40.6)	116 (7.3)	85 (5.3)
		Making friends is important.	Important	Somewhat important	<u>Not so much</u>
1421 (88.8)	144 (9.0)		21 (1.3)	14 (0.9)	
	Breakfast is important.	Important	Somewhat important	<u>Not so much</u>	<u>Not important</u>
		1265 (79.0)	272 (17.0)	43 (2.7)	20 (1.3)
Reinforcing factors	Feel safe at school.	Safe	Somewhat safe	<u>Not very safe</u>	<u>Not safe</u>
		405 (25.3)	855 (53.4)	227 (14.2)	111 (6.9)
	Family praises me when I study hard.	Praise	Praise a little	<u>Not so much</u>	<u>Don't praise</u>
		572 (35.8)	611 (38.2)	267 (16.7)	150 (9.4)
	Ijime in my class.	<u>Frequently</u>	<u>Sometimes</u>	Not so much	Not at all
		29 (1.8)	123 (7.7)	188 (11.8)	1260 (78.9)
	Having friends I like at school.	Many friends	Some	<u>Not many</u>	<u>None</u>
	1277 (79.9)	256 (16.0)	52 (3.3)	15 (0.9)	
	Tasty breakfast.	Tasty	Somewhat tasty	<u>Not so much</u>	<u>Not tasty</u>
		558 (34.9)	819 (51.2)	127 (7.9)	96 (6.2)
	Forgetting worries by becoming absorbed in something.	Forget	Forget a little	<u>Not so much</u>	<u>Can't forget</u>
	754 (47.1)	640 (40.0)	122 (7.6)	84 (5.3)	
	Parents understand my interests.	Understand	Understand a little	<u>Not so much</u>	<u>Don't understand</u>
		514 (32.3)	712 (44.5)	242 (15.1)	132 (8.3)
Enabling factors	Easy to understand lessons.	Easy	Somewhat easy	<u>Not very easy</u>	<u>Not easy</u>
		458 (28.6)	880 (55.0)	177 (11.1)	85 (5.4)
	Speaking to friends easily.	Often	Seldom	<u>Not so much</u>	<u>Don't speak</u>
	1116 (69.8)	392 (24.5)	75 (4.7)	17 (1.1)	
	Eating breakfast with family.	Always eat	Sometimes	<u>Seldom</u>	<u>Never</u>
		457 (28.6)	373 (23.3)	327 (20.4)	443 (27.7)

† Underline indicates negative answers.

Table 5 “Behavior and lifestyle” factors for problematic QOL

Questions	Answers	Problematic QOL group	No Problematic QOL group	Odds Ratio	95% Confidence Interval	P
Studying with high motivation.	Always/Sometimes	126 (47.5)	843 (63.1)	1		
	Rarely/Not at all	139 (52.5)	492 (36.9)	1.64	1.23–2.18	0.00
Going to school everyday.	Everyday	259 (97.7)	1328 (99.5)	1		
	Sometimes/Rarely/Not at all	6 (2.3)	7 (0.5)	2.07	0.61–7.03	N.S.
Getting along with my friends.	Very well/Sometimes	198 (74.7)	1219 (91.3)	1		
	Rarely/Not at all	67 (25.3)	116 (8.7)	2.72	1.91–3.89	0.00
Eating breakfast everyday.	Everyday	239 (90.2)	1251 (93.7)	1		
	Sometimes/Rarely/Never	26 (9.8)	84 (6.3)	1.16	0.70–1.92	N.S.
Having things I am interested in.	Many/Some	181 (68.3)	1129 (84.6)	1		
	Not many/None	84 (31.7)	206 (15.4)	1.7	1.23–2.34	0.00
Making my own decisions.	Always/Often	194 (73.2)	1171 (87.7)	1		
	Sometimes/Never	71 (26.8)	164 (12.3)	1.8	1.28–2.53	0.00

Data are No. (%)

N.S., Not significant

Results are from multivariable (adjusted OR) logistic analyses.

Dependent variables entered in the model are QOL category; school, grade, and sex are confounding variables.

Table 6 Relation between predisposing, reinforcing and enabling factors, and the 4 identified “Behavior and lifestyle” factors

Questions	Answers	Studying with high motivation			Getting along with my friends			Having things I’m interested in			Making my own decisions		
		Always Sometimes	Rarely Not at all	OR	Very well Sometimes	Rarely Not at all	OR	Many Some	Not many None	OR	Always Often	Sometimes Never	OR
Need school to prepare for adulthood.	Need/Some need Little	892 (92.1)	507 (80.3)	1	1257 (88.7)	142 (77.6)	1	1156 (88.2)	243 (83.8)	1	1201 (88.0)	198 (84.3)	1
	Need/Don’t need	77 (7.9)	124 (19.7)	1.36**	160 (11.3)	41 (22.4)	0.75*	154 (11.8)	47 (16.2)	0.87	164 (12.0)	37 (15.7)	1.01
Making friends is important.	Important/Somewhat important	957 (98.8)	608 (96.4)	1	1399 (98.7)	166 (90.7)	1	1286 (98.2)	279 (96.2)	1	1338 (98.0)	227 (96.6)	1
	Not so much/ Not important	12 (1.2)	23 (3.6)	1.08	18 (1.3)	17 (9.3)	0.86	24 (1.8)	11 (3.8)	0.81	27 (2.0)	8 (3.4)	0.68*
Breakfast is important.	Important/Somewhat important	940 (97.0)	597 (94.6)	1	1369 (96.6)	168 (91.8)	1	1269 (96.9)	268 (92.4)	1	1317 (96.5)	220 (93.6)	1
	Not so much/ Not important	29 (3.0)	34 (5.4)	0.92	48 (3.4)	15 (8.2)	0.93	41 (3.1)	22 (7.6)	1.01	48 (3.5)	15 (6.4)	0.98
Feel safe at school.	Safe/Some safe	804 (83.0)	458 (72.6)	1	1187 (83.8)	75 (41.0)	1	1063 (81.1)	199 (68.6)	1	1113 (81.5)	149 (63.4)	1
	Not very safe/Not safe	165 (17.0)	173 (27.4)	1.06	230 (16.2)	108 (59.0)	2.29**	247 (18.9)	91 (31.4)	0.95**	252 (18.5)	86 (36.6)	1.22
Family praise me when I study hard.	Praise/Praise a little	756 (78.0)	426 (67.5)	1	1070 (90.5)	112 (9.5)	1	1011 (77.2)	171 (59.0)	1	1020 (74.7)	162 (68.9)	1
	Not so much/Don’t praise	213 (22.0)	205 (32.5)	1.1	347 (83.0)	71 (17.0)	1.2	229 (22.8)	119 (41.0)	1.15	345 (25.3)	73 (31.1)	0.96
Ijime in my class.	Not so much/Not at all	880 (90.8)	565 (89.5)	1	1321 (93.2)	124 (67.8)	1	1188 (90.7)	257 (88.6)	1	1245 (91.2)	200 (85.1)	1
	Sometimes/Frequently	89 (9.2)	66 (10.5)	1.04	96 (6.8)	59 (32.2)	0.57**	122 (9.3)	33 (11.4)	1.25*	120 (8.8)	35 (14.9)	0.89
Having friends I like at school.	Many friends/Some	941 (97.1)	592 (93.8)	1	1398 (98.7)	135 (73.8)	1	1271 (97.0)	262 (90.3)	1	1320 (96.7)	213 (90.6)	1
	Not many/None	28 (2.9)	39 (6.2)	0.94	19 (1.3)	48 (26.2)	2.16	39 (3.0)	28 (9.7)	1.55	45 (3.3)	22 (9.4)	1.09
Tasty breakfast.	Tasty/Somewhat tasty	850 (87.7)	528 (83.7)	1	1238 (87.4)	140 (76.5)	1	1158 (88.4)	220 (75.9)	1	1193 (87.4)	185 (78.7)	1
	Not so much/Not tasty	119 (12.3)	103 (16.3)	0.99	179 (12.6)	43 (23.5)	1.01	152 (11.6)	70 (24.1)	1.15	172 (12.6)	50 (21.3)	1.07
Forgetting worries by becoming absorbed in something.	Forget/Forget a little	859 (88.6)	535 (84.8)	1	1259 (88.8)	135 (73.8)	1	1167 (89.1)	227 (78.3)	1	1216 (89.1)	178 (75.7)	1
	Not so much/Can’t forget	110 (11.4)	96 (15.2)	1	158 (11.2)	48 (26.2)	0.97	143 (10.9)	63 (21.7)	1.29**	149 (10.9)	57 (24.3)	1.33**
Parents understand my interests.	Understand/Understand a little	780 (80.5)	445 (70.5)	1	1118 (78.9)	107 (58.5)	1	1042 (79.5)	183 (63.1)	1	1067 (78.2)	158 (67.2)	1
	Not so much/Don’t understand	189 (19.5)	186 (29.5)	1.21*	299 (21.1)	76 (41.5)	0.96	268 (20.5)	107 (36.9)	1.36	298 (21.8)	77 (32.8)	1.15
Easy to understand lessons.	Easy/Somewhat easy	870 (89.8)	468 (74.2)	1	1216 (85.8)	122 (66.7)	1	1141 (87.1)	197 (67.9)	1	1175 (86.1)	163 (69.4)	1
	Not very easy/Not easy	99 (10.2)	163 (25.8)	1.71**	201 (14.2)	61 (33.3)	1.32*	169 (12.9)	93 (32.1)	1.58**	190 (13.9)	72 (30.6)	1.52**
Speaking to friends easily.	Often/Seldom	926 (95.6)	582 (92.2)	1	1381 (97.5)	127 (69.4)	1	1251 (95.5)	257 (88.6)	1	1308 (95.8)	200 (85.1)	1
	Not so much/Don’t speak	43 (4.4)	49 (7.8)	1.30*	36 (2.5)	56 (30.6)	3.22**	59 (4.5)	33 (11.4)	1.35*	57 (4.2)	35 (14.9)	1.68**
Eating breakfast with family.	Always Eat/Sometimes	534 (55.1)	296 (46.9)	1	756 (53.4)	74 (40.4)	1	718 (54.8)	112 (38.6)	1	723 (53.0)	107 (45.5)	1
	Seldom/Never	435 (44.9)	335 (53.1)	1.09	661 (46.6)	109 (59.6)	1.14	592 (45.2)	178 (61.4)	1.1	642 (47.0)	128 (54.5)	0.99

Data are No. (%)

OR: Odds Ratio * p<0.05 ** p<0.01

Results are from multivariable (adjusted OR) logistic analyses.

Dependent variables entered in the model are QOL category; school, grade, and sex are confounding variables.

by becoming absorbed in something" (1.33), "easy to understand lessons" (1.52) and "speaking to friends easily" (1.68) showed significantly increased odds ratios to "making my own decisions". Those results indicate that many of these questions were associated with both "reinforcing factors" and "enabling factors".

Discussion

In the present study we developed the questionnaire form to analyze actual QOL and inter relationships with factors related to the QOL in junior high school students. This workshop was organized with specialists working in the area of health activities for children and school students. We adopted the PRECEDE-PROCEED model to develop the questionnaire based on a concept and technique of health promotion proposed by WHO (28). Health promotion is characterized by empowerment of individual ability to cope with various conditions encountered in one's daily life by a participation-oriented activity (28). The PRECEDE-PROCEED model is characterized by a comprehensive and systemic model to evaluate the QOL as a final goal for each lifestyle and related factors to QOL by making a framework of consecutive phases leading to the high QOL (15). We consider those characteristics which might be the most available and suitable for achieving to a high QOL by junior high school students and establishing an appropriate control system for keeping their mental situation in their school life good and stable.

The results of the present study, such as high response rates by the subjects, high percentage of "important" answers for each of the 7 QOLPAV questions set up by our workshop and high scores of Chronbach's α for the QOLPAV area indicate the present questionnaire has sufficient validity to assess the actual QOL and relationship with influencing factors on QOL such as behaviors and enhancing factors in junior high school students. The scores of QOLPAV were to be 0.41 ± 0.98 . On the contrary, the Toronto University Health Promotion Center reported their score was 0.99 ± 0.71 in grade nine to thirteen students (25). As Suzuki et al. reported, it is important to clarify grade, sex and environment when studying QOL among junior high school students in Japan (29). Additionally, the differences between two studies may be attributed by race, culture and age. However, it is undeniable that Japanese junior high school students might be expected to experience stress. We will conduct a further study to clarify the actual QOLPAV of junior high school students using the questionnaire we developed.

Regarding the responses to questions on behaviors, such as "studying with high motivation", "having things I am interested in" and "making my own decisions" which did not show a high percentage of positive answers (Table 3), these questions might be considered to represent the condition of positive willing, independence and strong intentions of junior high school students.

Positive answers were predominant in questions about breakfast and going to school (Table 3). According to the research of Wang T et al., 68.0% of eighth grade students answered that they are "eating breakfast everyday" (30). In our

study 79.1% of the subjects ate breakfast every day, indicating there was no remarkable discrepancy between these two findings. On the contrary, nearly half of the students answered negative in "eating breakfast with family" on to the questions about three enhancing factors (Table 4). Sakai pointed out a similar tendency toward a decline in the numbers of children who ate breakfast with their families and suggested that this problem affected not only children but also families, local communities and the nation as a whole (31). It will also be necessary to identify various other factors related to food habits.

Regarding negative answers among three enhancing factors in Table 4, low percentages showed in "reinforcing" and "enabling factors" such as answers to "feel safe at school" (25.3%), "easy to understand lesson" (28.6%) and "always eating breakfast with family" (28.6%) compared with the results of "predisposing factors". We consider that those results indicate it might be difficult for junior high school students to realize their desired behaviors by themselves without surrounding supports.

As to the results of the logistic analysis between QOLPAV and behaviors, 4 behaviors factors had significant relations to QOLPAV scores. It is noticeable that these 4 factors may be considered to indicate achievement of positive willing and high coping ability in junior high school students and that these factors showed relatively high percentages of negative answers except to that of "getting along with my friends".

As to the logistic analysis between 4 behaviors which showed significant relation to QOLPAV and enhancing factors, two questions such as "easy to understand lessons" and "speaking to friends easily" were seen commonly to be significant to all of the 4 behavior factors (Table 6). It is noticeable that these two questions are representing the enabling factors. Enabling factors represent the promotion of individual behaviors by systems or surrounding conditions and by the acquisition of skills (32). Student's school life concerning education and their relationship skills might be enhance their QOL. The next significant factor shown in the present analysis is "reinforcing factors". "Reinforcing factors" represent social support and feedback conveyed through the behavior or attitude of important persons, such as friends and family members (32). One study has reported that friends and family members have a great influence on early adolescents with regard to drug use or smoking (33). The "reinforcing factors" might be important keys in addition to "enabling factors" to improve behaviors of the students.

As to the questions related to friends in the areas of behaviors and enhancing factors, high percentages of "positive" answers were seen in all questions (Table 4) and they also showed significant relation to the QOLPAV (Table 5). It has been reported that relationships are important for the mental health of junior high school students in Japan (34). Thus the present result indicates that to maintain the present satisfactory situation of factors related to friends, it should be necessary to keep a high level of QOLPAV in each junior high school student.

Meanwhile, Asakura reported that the results of QOL did not necessarily correlate to modification of behaviors using the PRECEDE-PROCEED model (35). Green suggested that these

three enhancing factors might be modifiable determinants of behaviors and reported that they might represent a hierarchy of factors affecting behaviors, i.e., “predisposing” as the strongest followed by “enhancing” and “reinforcing” (32), which showed a different tendency in the present study. Regarding behavior modification, one new approach that has been studied is social marketing (36) as introduced in “the Sukoyaka Family 21 project” (8). Thus it has been pointed out that there are some limitations to adopt the PRECEDE-PROCEED model to analyze condition of QOL. However, it is indicated that the questionnaire we developed can clarify the correlation between QOLPAV, behaviors and enhancing factors without any contradiction and may provide useful information to improve students’ QOL according to the actual place in each school, as mentioned above.

The present study clarified that the questionnaire we developed has high validity to analyze actual QOL in junior high school students. And also that this questionnaire may be a

tool to promote student subjective participation for improvement of QOL, as well as bringing about a better mutual understanding between school students and staff at large.

We are now conducting a further survey to extend the subjects to establish a standard for quantitative evaluation of QOL, behaviors and enhancing factors in junior high school students and to develop a manual to promote the practical use for QOL questionnaire.

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